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 Title/Subject SUMMARY REPORT OF THE NATURE OF THE
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SUMMARY REPORT OF THE NATURE OF THE CHEMICAL CONTAMINANTS FOUND
IN THE ATMOSPHERE IN THE K-25, K-27, AND FERCLEVE AREAS

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Summary Report of the Nature of the Chemical Contaminants Found
in the Atmosphere in the K-25, K-27, and Fercleve Areas.

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Summary Report of the Nature of the Chemical Contaminants Found
in the Atmosphere in the K-25, K-27, and Fercleve Areas.

This report has been prepared with the specific objectives of (1) showing what chemical atmosphere contaminants are encountered in different locations, and (2) indicating in general which of these contaminants are of greatest potential hazard.

Except as indicated, the data represents air which operating personnel breathe for significant periods during a working day. An effort has been made to delete any data which was obtained with a particular objective such that the analysis would not be representative of a normal exposure condition.

Most of the locations covered in the report are currently being given routine periodic sampling. Such a location is identified by the final date of September 9, 1946 in the line showing the period covered. If the final date is given as prior to September 9, 1946 the location is merely being observed occasionally to detect any change in operations which might warrant reopening a sampling schedule.

Changes in operating procedures and production equipment in many areas have resulted in lower analyses at the present time than the averages shown for the periods covered by the report.

In cases where a location has been sampled fifty times or more for a particular contaminant a percentage breakdown of the data is given. If less than fifty samples were taken it appeared that a percentage breakdown might be misleading.

The reader is cautioned not to draw from the data any specific conclusions regarding the extent of health hazard in a given location. Only the medical department, which is familiar with many details that could not be included in this report is properly qualified to draw such conclusions.

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Section A. Contaminant T

Building 131, Normal Feed (Includes also, Buildings 309-1 and 402-4, used as temporary feed points)

Period Covered: December 17, 1945 through September 9, 1946.

Total number of air samples analyzed for T		(89)
Number of analyses of 0.00 mg.T/cu. meter	89%	(79)
Number of positive analyses of less than 0.2 mg. T/cu. meter	9%	(8)
Number of positive analyses of 0.2 mg.T/cu. meter or greater	2%	(2)

Not included in the above data is an analysis of 315 mg. T/cu. meter obtained when a valve failure released an entire cylinder (approximately 20 lbs.) of C-616 into the atmosphere.

Building 631, Depleted withdrawal (Includes also Buildings 311-1, 601, and 402-9 used as temporary withdrawal points)

Period Covered: December 12, 1945 through September 9, 1946.

Total number of air samples analyzed for T		(85)
Number of analyses of 0.00 mg.T/cu. meter	92%	(78)
Number of positive analyses of less than 0.2 mg. T/cu. meter	6%	(5)
Number of positive analyses of 0.2 mg. T/cu. meter or greater	2%	(2)

Building 1303, Miscellaneous T Recovery and Development

Period Covered: April 17, 1946 through September 9, 1946.

Total number of air samples analyzed for T		(81)
Number of analyses of 0.00 mg. T/cu. meter	86%	(70)
Number of positive analyses of less than 0.2 mg. T/cu. meter	8%	(6)
Number of positive analyses of 0.2 mg. T/cu. meter or greater	6%	(5)

Not included in the above data is an analysis of 4.2 mg. T/cu. meter obtained while T_2O_8 was being ground in a micro pulverizer, as the maximum allowable concentration of T_2O_8 is probably considerably higher than for the usually encountered water soluble T salts.

Building 1301, Miscellaneous T Recovery and Development

Period Covered: August 1, 1945 through September 9, 1946.

Total number of air samples analyzed for T		(8)
Number of analyses of 0.00 mg.T/cu. meter		(7)
Number of positive analyses of 0.2 mg.T/cu. meter or greater		(1)

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Building 1401, Miscellaneous T Recovery and Development

Period Covered: August 2, 1946 through September 9, 1946.

Total number of air samples analyzed for T	(3)
Number of analyses of 0.00 mg. T/cu. meter	(2)
Number of positive analyses of less than 0.2 mg. T/cu. meter	(1)

Building 306-7, Operating Floor Product Withdrawal

Period Covered: July 9, 1946 through September 9, 1946.

Total number of air samples analyzed for T	(4)
Number of analyses of 0.00 mg. T/cu. meter	(3)
Number of positive analyses of less than 0.2 mg. T/cu. meter	(1)

Building 413

Period Covered: August 26, 1946 through September 9, 1946.

Total number of air samples analyzed for T	(2)
Number of analyses of 0.00 mg. T/cu. meter	(2)

Building 601, G-74 Removal

Period Covered: August 19, 1945 through October 11, 1945

Total number of air samples analyzed for T	(13)
Number of analyses of 0.00 mg. T/cu. meter	(10)
Number of positive analyses of 0.2 mg. T/cu. meter or greater	(3)

depleted material

This data does not include the/withdrawal operation reported
in Section A above.

Miscellaneous Process Areas

Period Covered: January 23, 1945 through July 31, 1946.

Total number of air samples taken for T analysis	(25)
Number of analyses of 0.00 mg. T/cu. meter	(12)
Number of positive analyses of less than 0.2 mg. T/cu. meter	(6)
Number of positive analyses of 0.2 mg. T/cu. meter or greater	(7)

The above data represents samples taken when leaks of C-616
were known to have occurred or where a C-616 leak was suspected.

Fercleve Work Shops

Period Covered: January 12, 1945 through September 6, 1945.

Total number of air samples taken for T analysis		(71)
Number of analyses of 0.00 mg. T/cu. meter	20%	(15)
Number of positive analyses of less than 0.2 mg. T/cu. meter	40%	(28)
Number of positive analyses of 0.2 mg. T/cu. meter or greater	40%	(28)

The above air samples were taken while Fercleve was functioning as an integral part of the CEW program.

Section B. Contaminant F₂ and HFBuilding 1301, Production of F₂

Period Covered: August 1, 1945 through September 9, 1946.

Total number of air samples analyzed for F ₂		(105)
Number of analyses of less than 0.1 p.p.m. as F ₂	69%	(72)
Number of analyses between 0.1 p.p.m. and 2.0 p.p.m. as F ₂	22%	(23)
Number of analyses of greater than 2 p.p.m. as F ₂	9%	(10)

Air samples taken during stages of changing electrodes in an electrolytic cell showed analyses between 9 p.p.m. and 22 p.p.m. calculated as HF.

Analyses made within a few feet of a portable F₂ disposal unit when the unit was not operating properly showed about 100 p.p.m. calculated as F₂. The whole room showed about 40 p.p.m. calculated as F₂.

Building 1303, Miscellaneous T Recovery and Development.

Period Covered: July 23, 1946 through September 9, 1946.

Total number of air samples analyzed for F ₂	(7)
Number of analyses of less than 0.1 p.p.m. as F ₂	(6)
Number of analyses between 0.1 p.p.m. and 2.0 p.p.m. as F ₂	(1)

Building 1401, Miscellaneous T Recovery and Development

Period Covered: June 20, 1946 through September 9, 1946.

Total number of air samples analyzed for HF	(5)
Number of analyses of less than 0.5 p.p.m. as HF	(4)
Number of analyses between 0.5 p.p.m. and 2.0 p.p.m. as HF	(1)

One air sample was taken when CoF₃ dust was known to be in the air. The analysis showed 12.5 mg. CoF₃/cu. meter.

Field Conditioning in K-25 and K-27 Areas

Period Covered: January 3, 1946 through February 12, 1946.

Total number of air samples analyzed for F ₂	(18)
Number of analyses of less than 0.1 p.p.m. as F ₂	(13)
Number of analyses between 0.1 p.p.m. and 2.0 p.p.m. as F ₂	(5)

Note: The data in Section B has been calculated as F₂ or as HF based upon a knowledge of which to expect in the area and the field representative sensory observations. The test used will record the presence of any fluoride which is appreciably ionized in aqueous solution.

Section C. Contaminant Mercury Vapor

Building 1024, Room 13 Wing, Instrument Repair

Period Covered: January 7, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg		(209)
Number of analyses of less than 0.1 mg. Hg/cu. meter	45%	(95)
Number of analyses of 0.1 mg. Hg/cu. meter or greater	55%	(114)

One operation (no longer conducted in the original manner) caused the immediate area to contain as high as 17 mg. Hg/cu. meter of air.

Building 1024, Room 4 Wing, Instrument Repair

Period Covered: May 17, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg		(34)
Number of analyses of less than 0.1 mg. Hg/cu. meter		(31)
Number of analyses of 0.1 mg. Hg/cu. meter or greater		(3)

Mercury Recovery - Conditioning Building Laboratory

Period Covered: December 12, 1945 through December 21, 1945.

Total number of air samples analyzed for Hg		(23)
Number of analyses of less than 0.1 mg. Hg/cu. meter		(0)
Number of analyses of 0.1 mg. Hg/cu. meter or greater		(23)

The above 23 analyses averaged 0.3 mg. Hg/cu. meter

Mercury Recovery - 1401 Building and 1301 Building

Period Covered: January 29, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg		(60)
Number of analyses of less than 0.1 mg. Hg/cu. meter	43%	(26)
Number of analyses of 0.1 mg. Hg/cu. meter or greater	57%	(34)

Mercury Recovery - Building 1004-D, Rooms 11 and 12.

Period Covered: August 1, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg		(28)
Number of analyses of less than 0.1 mg. Hg/cu. meter		(10)
Number of analyses of 0.1 mg. Hg/cu. meter or greater		(18)

Building 1004-D, All Rooms Handling Mercury Regularly

Period Covered: December 11, 1945 through September 9, 1946.

Total number of air samples analyzed for Hg	(45)
Number of analyses of less than 0.1 mg. Hg/cu. meter	(36)
Number of analyses of 0.1 mg. Hg/cu. meter or greater	(9)

This data does not include the Mercury Recovery Operations in Rooms 11 and 12.

Building 1004-C Rooms 261 and 265.

Period Covered: June 3, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg	(40)
Number of analyses of less than 0.1 mg. Hg/cu. meter	(18)
Number of analyses of 0.1 mg. Hg/cu. meter or greater	(22)

Building 1004-C, Room 207

Period Covered: May 21, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg	(24)
Number of analyses of less than 0.1 mg. Hg/cu. meter	(24)

Miscellaneous Process Areas

Period Covered: May 2, 1946 through September 9, 1946.

Total number of air samples analyzed for Hg	(10)
Number of analyses of less than 0.1 mg. Hg/cu. meter	(8)
Number of analyses of 0.1 mg. Hg/cu. meter or greater	(2)

Section D. Contaminant TCE

Building 1401, Degreasing Tank - Ground Level

Period Covered: December 5, 1944 through September 9, 1946.

Total number of air analyses made		(798)
Number of analyses of less than 100 p.p.m.	30%	(237)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	70%	(561)

Building 1401, Cleaning and Drying of Depleted Product Storage Cylinders - Ground Level

Period Covered: January 24, 1946 through June 10, 1946.

Total number of air analyses made		(115)
Number of analyses of less than 100 p.p.m.	10%	(11)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	90%	(104)

Building 1401, Degreasing Tank Area - Crane Level

Period Covered: June 12, 1946 through July 17, 1946.

Total number of air analyses made		(26)
Number of analyses of less than 100 p.p.m.		(5)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made		(21)

Building 1401, Pump Repair Shop

Period Covered: November 29, 1945 through September 9, 1946.

Total number of air analyses made		(41)
Number of analyses of less than 100 p.p.m.		(8)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made		(33)

Line Recorder Stations in K-25 and K-27 Areas

Period Covered: May 21, 1946 through June 7, 1946.

Total number of air analyses made		(102)
Number of analyses of less than 100 p.p.m.	73%	(74)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	27%	(28)

At least thirteen of the twenty-eight analyses above showing 100 p.p.m. or greater represent the operation of adding replacement quantities of trichloroethylene or dry ice to the cold traps. Accordingly these are maximum exposures experienced for short periods of time only.

Building 1401, Air Conditioning Room

Period Covered: August 22, 1946 through September 9, 1946.

Total number of air analyses made	(2)
Number of analyses of less than 100 p.p.m.	(1)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	(1)

Trichloroethylene is not usually present in this room. A special repair operation is in progress in which trichloroethylene is used as a degreaser.

Building 1301, Cold Traps

Period Covered: March 28, 1946 through August 13, 1946.

Total number of air analyses made	(40)
Number of analyses of less than 100 p.p.m.	(29)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	(11)

The use of trichloroethylene in these cold traps has been discontinued.

Building 1401, Seal Shop

Period Covered: December 28, 1944 through September 9, 1946.

Total number of air analyses made	(5)
Number of analyses showing less than 100 p.p.m.	(2)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	(3)

Building 1024, Room 13 Wing, Instrument Repair

Period Covered: May 8, 1946 through May 13, 1946

Total number of air analyses made	(5)
Number of analyses of less than 100 p.p.m.	(2)
Number of analyses showing 100 p.p.m. or greater during a significant portion of the time the analysis was being made	(3)

Section E. Contaminant CCl_4

Building 1401, Miscellaneous T Recovery and Development

A single investigation of this area was made on June 10, 1946.
No evidence of CCl_4 vapor in the atmosphere was detected.

Section F. Contaminant Freon 113

312 Section, Pump Repair Shop

Period Covered: June 3, 1946 through June 24, 1946.

Total number of air analyses made (11)
Number of analyses of less than 500 p.p.m. (9)
Number of analyses showing 500 p.p.m. or greater
during a significant portion of the time the
analysis was being made (2)

Section G. Contaminant Acid (HCl) Vapor

Building 1401, Acid Bath H-304-B- Ground Level

Period Covered: June 12, 1946 through September 9, 1946.

Total number of air analyses made (19)
Number of analyses of less than 10 p.p.m. (1)
Number of analyses of 10 p.p.m. or greater (18)

One analysis showing 110 p.p.m. HCl was reported.

Building 1401, Acid Bath H-304-B- Crane Level

Period Covered: June 21, 1946 through July 30, 1946.

Total number of air analyses made (6)
Number of analyses of less than 10 p.p.m. (6)

Building 1303, Miscellaneous T Recovery and Development

Period Covered: June 4, 1946 through September 9, 1946.

Total number of air analyses made (3)
Number of analyses of less than 10 p.p.m. (3)

Section H. Contaminant Ammonia

Building 1303 Miscellaneous T Recovery and Development

Period Covered: May 9, 1946 through September 9, 1946.

Total number of air analyses made (14)
Number of analyses of less than 100 p.p.m. (8)
Number of analyses of 100 p.p.m. or greater (6)

One analysis showing 350 p.p.m. NH_3 was reported

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Section I. Contaminant Nitrous Fume

Building 1303 Miscellaneous T Recovery and Development

Period Covered: May 17, 1946 through July 23, 1946

Total number of air analyses made (3)
 Number of analyses of less than 10 p.p.m. (3)

Building 1004-D Room 8

Period Covered: July 22, 1946 through September 9, 1946.

Total number of air analyses made (4)
 Number of analyses of less than 10 p.p.m. (2)
 Number of analyses of 10 p.p.m. or greater (2)

Section J. Contaminant Phosgene

Chemical Warfare Service Cylinders

Period Covered: April 27, 1945 through March 28, 1946.

Total number of cylinders examined (458)
 Number showing phosgene present 5% (22)

Section K. Contaminant Combustibles

The following areas were inspected for combustibles. In no cases were explosive atmospheres found.

Fercleve Area tank farm. (January 30, 1946)
 Building 312-2, pipe housing, pipe gallery (January 29, 1946)
 Fercleve Area, Reduction Room, Building F-05 (May 1, 1946)
 Building 1024 (August 29, 1946 to locate Pyrofax leak)

Section L. Miscellaneous Contaminants

Cadmium: A series of seven air samples were taken on May 9, 1945 while cold traps in Building 301-2 were being spray coated with cadmium. Analyses from 0.3 mg. Cd/cu. meter to 800 mg. Cd/cu. meter were reported. The area was isolated and the personnel were wearing protective equipment.

Fluorocarbons: Fluorocarbons in the atmosphere have been detected qualitatively. Development of a satisfactory test is required before any significant data can be obtained.

Dust Counting: A dust survey of the 1401 building carpenter shop is now in progress.